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The Use of Historic Mid and Low Latitude Aurora Observations for Possible Dating of Major Solar Proton Fluence Events

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Impulsive increases in the nitrate concentration in polar ice have been identified as proxies for large solar proton events having a >30 MeV omni-directional fluence exceeding 10^9 cm^{-2} (McCracken et al., 2001a,b). These identifications have been made using high-resolution nitrate measurements (up to 20 samples per year) from Arctic and Antarctic ice cores. Dating of the ice cores is done from the seasonal variation of the background nitrates in addition to the dramatic increase in conductivity resulting from volcanic eruptions. Additional information on the approximate dates of major solar-terrestrial events can be obtained from mid and low latitude auroral observations. Examples of the use of mid and low latitude auroral records including those of the Korean Chronicles to assist in dating major solar proton events are shown. These and similar records will be essential as deeper ice cores are obtained and analyzed for major solar proton events that occurred in the last several millennia.

Keywords: Low Latitude Aurora, Solar Proton Events, Polar Ice Cores

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